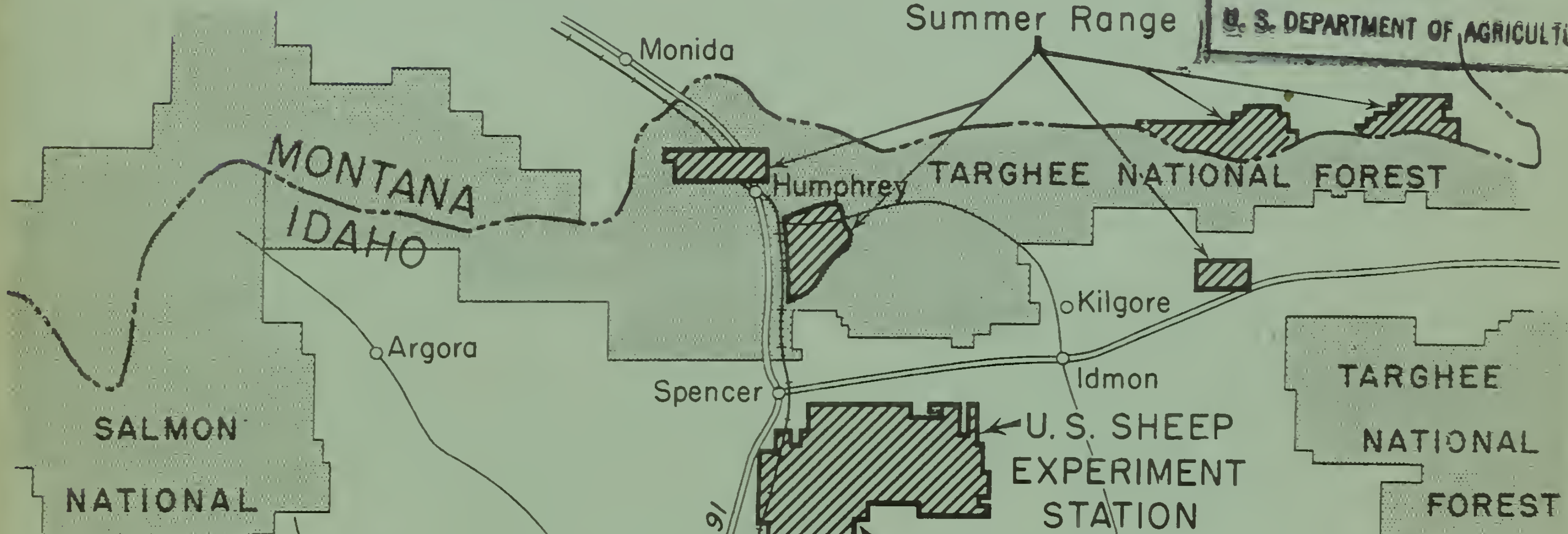
UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH ADMINISTRATION
BUREAU OF ANIMAL INDUSTRY

TWELFTH ANNUAL REPORT OF THE
U. S. SHEEP EXPERIMENT STATION

DUBOIS, IDAHO
JUNE 30, 1949



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ANNUAL REPORT
U. S. Sheep Experiment Station
June 30, 1949

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ROSTER OF PERSONNEL

WESTERN SHEEP BREEDING LABORATORY AND U. S. SHEEP EXPERIMENT STATION

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Name	Rating	Date Entered on Duty	General Duties
Nordby, Julius E.	Animal Husbandman	Mar. 1, 1938	Director
Terrill, Dr. Clair E.	Animal Husbandman	July 3, 1936	Genetics and Physiology
Stoehr, John A.	Animal Husbandman	Aug. 28, 1928	Operations
Emik, Dr. L. Otis	Animal Husbandman	July 7, 1941	Statistics and Genetics
Wilson, Lowell O.	Foreman of Farm Laborers	July 1, 1943	Assistant, Operations
Schaefer, Chester F.	Clerk	June 22, 1936	Chief Clerk
Hensley, Gladys L.	Clerk	Aug. 4, 1947	Clerk
Taylor, Jessie S.	Clerk	Aug. 25, 1947	Clerk
Twardak, Dorothy M.	Clerk	Sept. 7, 1948	Clerk
Jeffery, Lee C.	Foreman of Farm Laborers	June 7, 1924	General Maintenance, Pumps, Equipment
Rasmussen, Jr., Henry	Farm Laborer	July 1, 1926	Sub-Foreman
Anderson, Daniel	Farm Laborer	Aug. 4, 1947	Shepherd
Bybee, Bert L.	Farm Laborer	April 4, 1949	Farm Laborer
Gates, Kendrick J.	Farm Laborer	Nov. 29, 1948	Shepherd
Goldman, James R.	Farm Laborer	May 1, 1939	Shepherd
Hohman, Max E.	Farm Laborer	April 1, 1935	Shepherd
Howard, John H.	Farm Laborer	Oct. 2, 1944	Camp Tender
Ingram, Parley F.	Farm Laborer	Apr. 20, 1947	Shepherd
Phillips, Walter H.	Farm Laborer	Mar. 16, 1935	Truck Driver
Powell, Fred A.	Farm Laborer	May 11, 1935	Teamster
Swink, Albert B.	Farm Laborer	May 31 1946	Farm Laborer
Nantz, Mrs. Dorinda R.	Laborer	June 16, 1941	Janitress and Cook

PUBLICATIONS

The following papers have been published or mimeographed by the U. S. Sheep Experiment Station since 1937. The complete list is included again this year for your convenience. Publications which have also been contributed to by the Western Sheep Breeding Laboratory are starred. A number of contributions have been made to livestock journals and the general press that are not included in this series. They are for the most part adaptations of the regular series prepared for the lay reader.

1. Measurement of Reproductive Capacity as an Aid in Selection of Rams of High Fertility (A preliminary report). C. E. Terrill, Proc. of the Amer. Soc. of An. Prod., 1937, pp. 311-316.

2. Artificial Insemination of Ewes. C. E. Terrill and E. M. Gildow, National Wool Grower, 27(12):35, Dec., 1937.

3. Another Experiment on Long Range Paternity in Sheep. C. E. Terrill and E. M. Gildow, Jour. of Heredity, 29(2):77-78, Feb., 1938.

4. Artificial Insemination of Ewes with Transported Semen. E. M. Gildow and C. E. Terrill, Jour. of Amer. Vet. Med. Assoc. N. S. 46(3):157-159, Sept., 1938.

* 6. A Preliminary Study of the Relation Between Fleece Characteristics of Weanling and Yearling Range Sheep. W. V. Lambert, J. I. Hardy and R. G. Schott, Proc. of the Amer. Soc. of An. Prod., 1938, pp. 298-303.

* 7. Reproduction in Range Sheep. C. E. Terrill and John A. Stoehr, Proc. of the Amer. Soc. of An. Prod., 1939, pp. 369-375.

* 8. Selection of Range Rambouillet Ewes. C. E. Terrill, Proc. of the Amer. Soc. of An. Prod., 1939, pp. 333-340.

9. Comparison of the Accuracy of Two Methods of Estimating Fineness of Wool Fibers. Ralph W. Phillips, R. G. Schott, J. I. Hardy and H. W. Wolf, Jour. of Agr. Res. 60(5):343-350, Mar. 1, 1940.

10. A Summary of Three Year's Work in the Transportation of Ram Semen for Artificial Insemination. Ralph W. Phillips, R. G. Schott, E. M. Gildow and C. E. Terrill. Proceedings of the Second National Meeting of Veterinary Surgeons of Italy, 1940. pp. 231-237.

11. The Western Sheep Breeding Laboratory and U. S. Sheep Experiment Station. Julius E. Nordby, Extension Animal Husbandman, Sept., 1940.

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13. Some Factors Affecting the Progeny Testing of Rams. Ralph W. Phillips, R. G. Schott, W. V. Lambert and G. W, Brier, U.S.D.A. Cir. 580, 17 pp., Oct., 1940.

*14. The Application of a Rapid Comparator Method for Determining Fineness and Variability in Wool. Elroy M. Pohle, Proc. of the Amer. Soc. of An. Prod., 1940, pp. 161-168.

15. Comparison of Ram Semen Collection Obtained by Three Different Methods for Artificial Insemination. Clair E. Terrill. Proc. Amer. Soc. of An. Prod., 1940, pp. 201-207.

*16. Growth in Corriedale and Rambouillet Sheep under Range Conditions. Ralph W. Phillips, John A. Stoehr and G. W. Brier, Proc. of the Amer. Soc. of An. Prod., 1940 pp. 173-181.

*17. Sheep Improvement for Range Production. Julius E. Nordby, Idaho Forester 23, 1941, Forestry School, University of Idaho.

19. Columbia Sheep and Their Place in Range Sheep Production. Damon A. Spencer and John A. Stoehr, A.H.D. No. 42, Oct., 1941, 2 pp. (Processed).

20. Targhee Sheep and Their Place in Range Sheep Production. Damon A. Spencer and John A. Stoehr, A.H.D. No. 43, Oct., 1941, 2 pp. (Processed)

*22. Wool Yield Determination in which Small Samples are Compared with Whole Fleeces. Ralph G. Schott, Elroy M. Pohle, Damon A. Spencer, and Glenn W. Brier, A.H.D. No. 50, Jan., 1942, 6 pp. (Processed).

*23. Wool Yields in the Small Side-Sample as Related to Individual Whole-Fleece Yields in Four Breed-Groups of Sheep. Ralph G. Schott, Elroy M. Pohle, Damon A. Spencer and Glenn W. Brier, Jour. of An. Sci. 1(2):137-144, May, 1942.

*24. The Importance of Body Weight in Selection of Range Ewes. Clair E. Terrill and John A. Stoehr, Jour. of An. Sci. 1(3):221-228, Aug., 1942.

*25. Relationship between Weanling and Yearling Fleece Characters in Range Sheep. Elroy M. Pohle, Jour. of An. Sci. 1(3):229-235, Aug., 1942.

*26. Staple Length in Relation to Wool Production. Elroy M. Pohle and Henry R. Keller, Jour. of An. Sci. 2(1):33-41, Feb., 1943.

*28. Staple Length and Its Influence on Shrinkage and Fleece Values. Elroy M. Pohle, and Henry R. Keller, National Wool Grower 33(6): 22-24, June, 1943.

29. Stabilizing Wool and Body Type in White Faced Crossbred Sheep for Western Range Production. Julius E. Nordby, National Wool Grower 33(7):15-17, (8):16-18, July and August, 1943.

*34. Estimation of Clean-Fleece Weight from Grease-Fleece Weight and Staple Length. Clair E. Terrill, Elroy M. Pohle, L. Otis Emik and Lanoy N. Hazel, Jour. of Agr. Res. 70(1):1-10, Jan. 1, 1945.

*35. Clean-Wool Yields in Small Samples from Eight Body Regions as Related to Whole-Fleece Yields in Four Breeds of Sheep. Elroy M. Pohle and L. N. Hazel, Jour. of An. Sci. 3(2):159-165, May, 1944.

*36. Shrinkage and Value by Grades for 1943 Range Wool. Elroy M. Pohle and Henry R. Keller. National Wool Grower 34(6):22-23, June, 1944. (Published in other Wool Growers Magazines).

37. Some Factors Affecting the Blood Phosphorus Level of Range Ewes. W. M. Beeson, Clair E. Terrill and D. W. Bolin, Jour. of An. Sci. 3(2):175-182, May, 1944.

38. The Accuracy of Measurements and Weights of Sheep. Ralph W. Phillips and John A. Stoehr, Jour. of An. Sci. 4(3):311-316, Aug., 1945.

*39. Monthly Changes in Fineness, Variability and Medullation in Hairy Lambs. Elroy M. Pohle, H. R. Keller and L. N. Hazel, Jour. of An. Sci. 4(1):37-46, Feb., 1945.

*41. The Influence of Location and Size of Sample in Predicting Whole-Fleece Clean Yields. E. M. Pohle, L. N. Hazel and H. R. Keller, Jour. of An. Sci. 4(2):104-112, May 1945.

*42. Wool Off-Sorts, Percentage, Shrink Value. Elroy M. Pohle and Henry R. Keller, Montana Wool Grower 18(6):7, June, 1944. (Published in Other Wool Growers Magazines.)

*44. Looking Forward, The Stabilizing Influence of Research in a Changing Sheep Production Economy. Julius E. Nordby, National Wool Grower 35(6):18-19, 35-36, June, 1945.

51. Effects of Some Environmental Factors on Weanling Traits of Range Columbia, Corriedale and Targhee Lambs. L. N. Hazel and Clair E. Terrill, Jour. An. Sci. 5(3):318-325, August, 1946.

52. Heritability of Weanling Traits in Range Columbia, Corriedale and Targhee Lambs. L. N. Hazel, and Clair E. Terrill. Jour. of An. Sci. 5(4):371-377, November, 1946.

*54. Length of Gestation in Range Sheep. Clair E. Terrill and L. N. Hazel, Amer. Jour. Vet. Res. 8(26):66-72, January, 1947.

56. Breed Crosses Used in the Development of Targhee Sheep. Clair E. Terrill. Jour. of An. Sci. 6(1):83 -92, February, 1947.

*57. Range Sheep Improvement Through Selection. Clair E. Terrill. National Wool Grower 36(12):17-19, December, 1946.

58. Color on the Legs of Sheep. Its Inheritance in the Columbia and Targhee Breeds. Clair E. Terrill. Jour. Hered. 38(3):89-92, March, 1947.

59. Effects of Some Environmental Factors on Yearling Traits of Columbia and Targhee Ewes. Clair E. Terrill, G. M. Sidwell and L. N. Hazel. Jour. An. Sci. 6(2):115-122, May,1947.

*60. It's the Clean Wool in the Fleece that Pays Off. Elroy M. Pohle. National Wool Grower 37(5):19-20, May, 1947.

*61. Statistical Treatment of Trichostrongylid Eggs. L. Otis Emik. Biometrics 3(2):89-93, June, 1947.

*62. Factors Affecting the Estimation of Concentration of Ram's Semen by the Photoelectrometric Method. L. Otis Emik and George M. Sidwell. Journal of Animal Science 6(4):467-475, Nov., 1947.

63. Development of Targhee Sheep. Clair E. Terrill and John A. Stoehr. National Wool Grower, 37(11):13-14, Nov., 1947.

*65. Gestation Period in Sheep. Clair E. Terrill and John A. Stoehr. Sheep and Goat Raiser 28(6):23, March, 1948. (Published in other Wool Growers Magazines.)

66. Effects of Some Environmental Factors on Yearling Traits of Columbia and Targhee Rams. Journal of Animal Science 7(2):181-190, May, 1948.

*69. Effect of Feed and Sickness on Wool Growth. Elroy M. Pohle. National Woolgrower 37(6), June, 1947.

*70. High Producing Rams Important. Elroy M. Pohle. National Woolgrower 38(1):21-22, January, 1948.

*71. Fleece Value Increases with Staple Length. Thos. D. Watkins, Jr. National Wool Grower 38(10):17-18, October, 1948. (Published in other Wool Growers Magazines.)

*72. Systematic Procedures for Calculating Inbreeding Coefficients. L. Otis Emik and Clair E. Terrill. Journal of Heredity 40(2): 51-55, Feb., 1949.

*73. Increasing Accuracy of Selecting Rams. To be processed by A.H. Div., Bur. of An. Ind., U.S.D.A.

*75. Activating Genetic Concept into Range Sheep Improvement. Julius E. Nordby. Northwest Science, 22(2):60-68, May, 1948.

*77. Science as a means of Sheep Improvement. Julius E. Nordby. Montana Wool Grower 23(1):17,64, January, 1949.

*78. Dangers and Benefits of Inbreeding Julius E. Nordby, National Wool Grower 39(1):12-13, 40, 42, January, 1949.

*81. Supplemental Grain for Wintering Ewe Lambs. John A. Stoehr and Clair E. Terrill. For National Wool Grower.

*82. Comparison of Elastrator with Cutting for Docking and Castrating. Clair E. Terrill and John A. Stoehr. For National Wool Grower.

84. Stocking Northern Great Plains Sheep Range for Sustained High Production. E. J. Woolfolk. U.S.D.A. Cir. 804, 39 pp., April,1949.

ABSTRACTS

The following abstracts have been published by the U. S. Sheep Experiment Station since 1937. Those which have also been contributed to by the Western Sheep Breeding Laboratory are starred. These abstracts are in general of work that has been or will be published and listed in the regular series of publications.

* 1. Relationship Between Weanling and Yearling Fleece Characters in Range Sheep. Elroy M. Pohle, Jour. of An. Sci. 1(1):60, Feb.,1942.

* 2. The Importance of Body Weight in Selection of Range Ewes. Clair E. Terrill and John A. Stoehr, Jour. of An. Sci. 1(1):60-61, Feb., 1942.

* 5. Estimation of Clean Fleece Weight from Unscoured Fleece Weight and Staple Length. Clair E. Terrill, Elroy M. Pohle and L. Otis Emik, Jour. of An. Sci. 1(4):357, Nov., 1942.

8. The Effect of Some Factors on the Blood Phosphorus Level of Range Ewes. W. M. Beesen, Clair E. Terrill and D. W. Bolin, Jour. of An. Sci. 2(4):369, Nov., 1943.

* 9. Clean Wool Yields in Small Samples from Eight Body Regions as Related to Whole-Fleece Yields in Four Breeds of Sheep. Elroy M. Pohle and L. N. Hazel, Jour. of An. Sci. 2(4):370, Nov., 1943.

*12. The Gestation Period of Range Sheep. Clair E. Terrill, Jour. of An. Sci. 3(4):434-435, Nov., 1944.

*13. The Influence of Location and Size of Sample in Predicting Whole-Fleece Clean Yield. Elroy M. Pohle and L. N. Hazel, Jour. of An. Sci. 3(4):452, Nov., 1944.

*16. Factors Affecting the Estimation of Concentration of Sperm in Rams' Semen by the Photoelectrometric Method. L. Otis Emik and George M. Sidwell. Anat. Rec. 97(3):69-70, March, 1947.

17. The Nature of Genetic Resistance of Sheep to Trichostrongylid Worms. L. Otis Emik. Jour. An. Sci. 5(4):415-414, Nov., 1946.

18. Inheritance of Color on the Legs in Columbia and Targhee Sheep. Clair E. Terrill, Jour. An. Sci. 5(4):414, November, 1946.

*19. The Effects of Environmental and Hereditary Factors on Trichostrongylid Worm Infestation on Sheep. L. Otis Emik and Paul W. Gregory. Jour. An. Sci. 6(4):477-478, Nov., 1947.

*21. Predicting Live Normal Sperm in Rams from Motility Scores. L. Otis Emik, Clair E. Terrill and Geo. M. Sidwell. Jour. An. Sci. 7(4):511, November 1948.

PROGRESS IN DEVELOPING LINES OF COLUMBIA AND TARGHEE SHEEP

Matings of Columbias were continued in 10 lines and 2 test pens in the fall of 1948. The number of ewes bred in lines increased from 318 in 1947 to 381 in 1948. 163 ewes were used in cross line matings as compared to 157 in 1947. Two rams were progeny tested on 18 or 19 First Cross Columbia ewes each. Inbreeding coefficients have not been calculated yet for Columbias. It is hoped that these can be brought up to date in the next 2 years.

The 8 Targhee lines which were established in 1940 were continued by using one ram in each line. The progress of inbreeding in these lines is shown in the following table:

Year lambed	No. of lines	No. of ewes bred	Average inbreeding coefficients in percent					
			Sires	Dams	Progeny	Increase of progeny over dams	Highest for progeny of any pen	Highest for any individual offspring
1941	8	192	8.2	3.5	9.6	6.1	16.4	30.9
1942	8	183	8.5	3.5	10.6	7.1	17.4	34.9
1943	8	202	7.2	3.5	10.6	7.1	22.5	34.9
1944	8	223	8.7	4.6	11.2	6.6	16.0	31.0
1945	8	257	5.0	7.5	13.1	5.6	20.8	35.9
1946	8	245	3.4	7.2	11.5	4.3	18.9	36.2
1947	8	267	5.5	8.0	13.5	5.5	21.9	41.4
1948	7	226	11.4	8.4	16.3	7.9	19.8	44.7

Only 7 lines are included in 1948 because ewes from one line were accidently bred to a Columbia ram. The increase in inbreeding of the progeny has averaged about 1 percent per year.

An additional 6 lines which have been started in recent years are not included in the table because inbreeding coefficients have not yet been calculated for all of these lines and because first crosses are still being made for some of these lines. A total of 202 ewes were bred in these 6 lines. Ten Targhee rams were used in progeny test matings to 21 to 22 ewes each in 1948. In addition a New Zealand Merino ram was mated to 42 Targhee ewes.

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LINE CROSSES IN COLUMBIAS

Studies of the advantages of lambs from line crosses over those from inbred lines were continued during the year. Adjusted (except for inbreeding) averages for 1948 for Columbia weanling lambs are presented in the following table:

Matings	No. lambs	Face covering	Staple length	Weaning weight	Type	Condition
		Score	cm.	lbs.	score	score
Cross-line lambs	130	3.13	4.43	78.8	1.78	2.12
Straight-line lambs from lines used in crossing	91	3.09	4.36	77.8	1.84	2.19
All Straight-line lambs	240	3.05	4.52	77.7	1.79	2.11

The lambs from lines used for crossing were slightly inferior to all lambs from lines with the exception of weaning weight. Cross-line lambs were superior to lambs from lines used in crossing for each trait except face covering. The advantages were not great, ranging from slightly over 1 percent for weaning weight to 3 percent for type and condition scores. These advantages were much less than in 1947.

It is planned in 1949 to mate rams from lines 2, 4, 8, 9 and 10, which have not been used to any extent in line crossing, to cross-line ewes to obtain information on the general crossing ability of these lines.

SELECTION PRACTICED WITH COLUMBIA AND TARGHEE WEANLING LAMBS

Weaning selection differentials demonstrate the amount of selection actually practiced on each crop of lambs. Considerable later selection is practiced on ram lambs, but much of the effective selection of ewes is made at weaning age.

The selection differentials or advantages of the selected lambs for 1947 in the following table, represent the difference between their average and the average for the entire group after corrections for environmental influences have been made. The percent of lambs saved based on the number present at weaning was 71 and 54 percent

for ram lambs and 86 and 73 percent for ewe lambs of Columbias and Targhees respectively.

SELECTION DIFFERENTIALS FOR COLUMBIA AND TARGHEE WEANLING LAMBS IN 1948

		Staple length (cm.)	Weaning weight (lbs.)	Type score	Condition score	Face covering score
COLUMBIA						
Rams	Advantage of selected lambs	.06	2.36	.11	.14	.10
	Relative emphasis	.08	.20	.25	.27	.24
Ewes	Advantage of selected lambs	-.04	.50	.02	.04	.03
	Relative emphasis	-.05	.04	.05	.08	.07
TARGHEE						
Rams	Advantage of selected lambs	.12	3.90	.12	.08	.25
	Relative emphasis	.27	.39	.26	.16	.42
Ewes	Advantage of selected lambs	-.02	.58	.05	.01	.10
	Relative emphasis	-.04	.06	.10	.02	.17

Selection differentials were generally lower in 1948 than in 1947 with the possible exception of Columbia ram lambs where a slightly smaller proportion of ram lambs were retained in 1948. With the exception of condition score the selection differentials were higher for Targhees than for Columbias. The greatest emphasis in selection was given to face covering in Targhees and to condition score in Columbias.

COMMERCIAL GRADES OF COLUMBIA FLEECES

		Yearling				Mature			
Sex	Year	1/2 Blood	3/8 Blood	1/4 Blood	L 1/4 Blood	1/2 Blood	3/8 Blood	1/4 Blood	L 1/4 Blood
		%	%	%	%	%	%	%	%
Rams	1942-45	6	60	34		2	58	40	
	1946	5	57	38			26	74	
	1947	3	56	41		2	40	58	
	1948	6	71	23			50	46	4
Ewes	1942-45	5	66	29		6	53	41	
	1946	4	42	53		3	47	50	
	1947	6	63	31		3	47	50	
	1948	6	69	24	1	2	47	45	6

There was some change in the grading of Columbia fleeces from 1947. All groups showed a higher proportion of fleeces grading 3/8 Blood over 1947 except mature ewes where the proportion was unchanged. Fleeces grading Low 1/4 Blood was shown separately from those grading 1/4 Blood in 1948. The two grades had been shown in one group previously. It appears that changes in grading standards from year to year account for much of the above yearly variation.

COMMERCIAL GRADES OF TARGHEE FLEECES

		Yearling				Mature				
Sex	Year	Fine Staple	1/2 Blood	3/8 Blood	1/4 Blood	Fine French	Fine Staple	1/2 Blood	3/8 Blood	1/4 Blood
		%	%	%	%	%	%	%	%	%
Rams	1942-45	8	78	14			2	88	8	2
	1946	8	81	11		3	6	71	20	
	1947	13	63	22	2		7	78	11	4
	1948	28	57	10	5		8	77	15	
Ewes	1942-45	7	79	14		2	11	79	7	1
	1946	8	76	16		5	13	70	10	2
	1947	23	62	14	1	4	12	68	15	1
	1948	15	68	10	7	5	21	62	11	1

There was a tendency in 1948 for more of the Targhee Fleeces to be thrown in the finer grades than in 1947. This did not appear to be true of yearling ewes. A majority of the Targhee fleeces in each group was graded 1/2 Blood.

PREDICTING LIVE NORMAL SPERM IN RAMS FROM MOTILITY SCORES

A study was made to determine the reliability of using visual estimates of motility to predict the percent of live normal sperm as counted on opal blue and eosin stained smears. 1140 ejaculates were analyzed from 428 ram trials of 30 minutes using Rambouillet, Columbia Targhee and Corriedale rams over a period of 3 years. Percentages were transformed to angles and the regression of motility on live normal sperm calculated. An empirical transformation and combination of motility percentage and score gave a nearly perfect fit. This latter transformation was then reapplied to the original data and a second analysis was made.

The total correlation between motility estimate and percent of live normal sperm was +.83 which with all measurable effects removed was reduced to +.34 for ejaculates within ram trials. Means for years showed an improvement with time which was to be expected from improvements being made in management of the rams. Breed differences were significant while the number of ejaculates per trial and the positional order of the ejaculate had no effect on means. In general visual estimates were more variable than counts from slides. The repeatability of visual estimates and counts were nearly identical at 0.8 which is highly significant. Repeatability of predicting count from visual estimate was .40 for ejaculates, .45 for trials and .24 for years.

The results show that visual estimates of motility may be transformed into an estimate of percent live normal sperm. The estimate is repeatable and has good predictive value for percent of live normal sperm. Visual estimates of sperm motility are therefore a useful measure of semen quality which can be obtained quickly and easily. These results indicate that more than one ejaculate is necessary to give an adequate trial for a ram but that one adequate trial in any one year will probably give an accurate value for that ram.

ELASTRATOR PROVES EQUAL TO CUTTING FOR DOCKING AND CASTRATING

The use of rubber rings (Elastrator) was compared with cutting (All in One Castrator) for docking and castrating under conditions at the U. S. Sheep Experiment Station, Dubois, Idaho. The lambs were of Columbia, Targhee and Rambouillet breeding and were born in April and May. Lambing was in sheds in April and was on the range in the latter part of April and in May as soon as range feed was available. The age of docking or castrating varied from a few days after birth up to 12 to 1 5 days of age but was similar for each method. Alternate lambs were docked or castrated by each method. The lambs were weaned at an average age of about 130 days.

A total of 983 lambs were docked with rubber rings and 993 with the cutting method. The percent of lambs weaned of those docked was 91.8 and 90.5 for the rubber ring and cutting methods respectively. The respective weights at weaning were 70.7 and 70.1 pounds.

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A total of 144 lambs were castrated with rubber rings and 142 by cutting. The percent of lambs weaned was 93.1 and 96.5 for the rubber ring and cutting methods respectively. The respective weaning weights were 71.7 and 72.8 pounds.

These results under range conditions at Dubois, Idaho indicate that there are no important differences in the two methods for the percent of lambs and weight of lambs weaned. Therefore the choice of method depends largely on convenience in use. The rubber rings can be more conveniently applied by one man within a few hours after birth when he handles the lamb anyway. At this Station docking and castrating with rubber rings is performed at the same time the lamb is eartagged and other records are taken. This eliminates the necessity of again rounding up the ewes and lambs to dock or castrate the lambs. This procedure has been followed with satisfactory results after the above trial was completed.

SUPPLEMENTAL GRAIN FOR WINTERING EWE LAMBS

A comparison of supplemental grain feeding versus no grain, with alfalfa hay on the winter feed yard was initiated in 1941. Lifetime lamb production is now available on these groups of ewes and the final summary of this comparison was completed this year. A total of 56 Targhee, 44 Columbia, 70 Corriedale and 212 Rambouillet ewe lambs were divided as equally as possible into 2 groups. Both groups received alfalfa hay and in addition one group received approximately one fourth pound of whole oats per head daily from January 10 to April 11, 1941. Thus the group fed grain received about 23 pounds of oats per head during the 92 day period.

The group fed grain averaged 13.5 pounds heavier at the end of the feeding period, 6.0 pounds heavier at shearing in the latter part of May and 4.8 pounds heavier at culling time in October than the other group. Fleece weights were slightly heavier for the group fed grain with an advantage of .23 pound of grease fleece weight and .09 pound of clean fleece weight. A slightly higher proportion were culled from the group that were not fed grain. Lifetime lamb production was slightly greater for the group not fed grain. This was true at each year of age except for 5-year-olds. Fleece and body weights at 2 years of age averaged slightly greater for the group fed grain, the advantages being 0.2 and 2.7 pounds respectively.

It appears from this test that there was no gain in later lamb production from supplemental feeding of grain to ewe lambs although this resulted in a definite advantage in body weight at yearling age. The slight advantages in fleece weight of the group fed grain would not compensate for the added cost of the grain. The grain feeding may have reduced hay consumption but data are not available on this point. It appears that winter feeding of alfalfa hay alone at Dubois provided adequate development for good lamb production.

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MEAN AND VARIABILITY OF FIBER DIAMETER OF FLEECE

The relations of mean fiber diameter, variability of fiber diameter and belly wool to weanling staple length and body weight, and yearling grease fleece weight, adjusted clean weight, face covering, staple length, body weight, type, condition and neck folds were calculated for 387 Rambouillet, 148 Targhee and 170 Columbia yearling ewes born in 1942 and 1943.

For mean diameter, only the correlations with grease fleece weight and adjusted clean weight were consistently significant within each of the breeds and for the three breeds combined. No indication was found that mean diameter per se would add any value to a selection index. Rams with heavier grease or clean fleece weights than their mean diameter would predict might be given extra consideration in selection. In the data for mean diameter, environmental effects of type of birth and year of birth contributed more than 2 percent of the total variance for Columbias and age at shearing contributed more than 2 percent for Targhees. Other environmental effects were not significant. Heritabilities from half-sib correlations were moderately high in Columbias and Targhees and rose to 1.1 for Rambouillets in 1944.

Variability of fiber diameter failed to show consistently significant correlations with any trait except type. No reasonable explanation can be given to account for this relationship. It is possible that fleeces of more uniform diameter present a more pleasing appearance which influences the scoring of type. Environmental factors had little effect on variability, the only two effects which contributed more than two percent to total variability sum of squares being years and regression on age at shearing. Heritabilities were low and non-significant.

Belly wool showed the most significant relationships. It was significantly related to grease fleece weight and clean fleece weight for all three breeds and a combination of the three. Relationships to staple length were consistently just below the 0.5 probability level but gave a highly significant relationship for the breeds combined. It would appear that belly wool is related to these other wool characters in a physiological and physical manner. Length of staple is probably the basic factor in causing increased belly wool, but the relationships indicate that the area of wool on the belly is also a factor.

Environmental effects had little influence on belly wool, only type of birth consistently contributing more than 2 percent of total variation for each of the 3 breeds. Inbreeding was important only for Targhees.

Heritability of belly wool varied from 0.6 for Columbias in 1943 to .82 for Targhees in 1943 when environmental factors were

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disregarded. After adjustment for environmental factors and combining years the heritability for Columbias was still not significant at .21, but highly significant for Targhees and Rambouillets at .61 and .51. These heritabilities are considerably higher than for weanling traits, but comparable to other yearling traits. Preliminary estimates from daughter-dam regressions would indicate that these results are not too high.

In summary, belly wool shows promise of contributing to the ability to select superior wool-producing animals. No indications of general applicability are evident for mean diameter of fiber or its variability.

SCOURING AND SORTING OF FLEECES

The majority of the 1948 clip was sent to the Texas Agricultural Experiment Station for sorting and scouring. The results of the sorting are not complete due to the use of various portions of the clip for experimental purposes. In addition, the Denver Wool Laboratory core-bored the various graded lots to give additional yield estimates. the scoured lots of wool were consigned to and sold by Beatty and Hyde. The wool market was not favorable at the time of sale.

DATA FROM SORTING REPORT 1948

	Pounds of Grease Wool in Sorts									
Graded Lots of Wool	Clear	Burry	Stain	Paint	Low	Tags	String	Cores	Bags	Total
Fine staple mature ewe	5951	503	92	253	58	7	21	219	100	7204
1/2 Blood mature ewe	4383	294	48	173	38	6	12	202	78	5234
3/8 Blood mature ewe	3297	132	56	77	62	9	9	138	54	3834
3/8 Blood yearling ewe	195	22	2	0	2	0	1	10	4	236
Fine staple Ram	1492	137	50	24	21	3	3	49	24	1803
1/2 Blood Ram	245	23	8	6	1	1	1	10	4	299
3/8 Blood Ram	714	75	23	16	34	4	3	28	12	909

Note: Complete reports on sorting are not available for some grades.

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DATA FROM SCOURING REPORTS, 1948

Lot No.		Grease weight	Clean weight	Yield in percent	Yield for Grade	Core* yield in percent
1	Fine Staple	2920	1477	50.6	49.6	51.4
2	Fine Staple	2835	1440	50.8		
3	Fine Staple	781	371	47.6		
4	Fine Staple	2859	1450	50.7		
5	Fine Staple	1751	800	45.7		
6	Fine French Combing	2037	1002	49.2	49.2	49.6
7	Fine French Combing	1765	870	49.3		
8	Fine French Combing	161	87	54.5		
9	Fine French Combing	133	59	44.8		
10	1/2 Blood Staple	1897	975	51.4	51.0	51.3
11	1/2 Blood Staple	1907	992	52.0		
12	1/2 Blood Staple	1655	856	51.7		
13	1/2 Blood Staple	542	260	48.0		
14	1/2 Blood Staple	902	441	48.9		
15	3/8 Blood Staple	2254	1255	55.7	53.9	51.2
16	3/8 Blood Staple	2255	1213	53.7		
17	3/8 Blood Staple	545	288	52.9		
18	3/8 Blood Staple	927	469	50.6		
19	1/4 Blood Staple	394	213	54.3	57.7	53.6
20	1/4 Blood Staple	1805	1038	57.5		
21	1/4 Blood Staple	1973	1166	59.1		
22	1/4 Blood Staple	574	325	56.7		
23	Rambouillet Crutchings	621	236	38.0		36.6
24	X-Bred Crutchings	1054	413	39.2		39.2
25	Grading Locks	488	182	37.4		41.2
26	Black	344	162	47.2		
27	Stained, Fine and 1/2 Blood	82	31	38.1		
28	Stained, 3/8 and 1/4 Blood	28	10	37.9		
29	Burry, Fine and 1/2 Blood	293	136	46.5		
30	Burry, 3/8 and 1/4 Blood	135	63	47.1		

* Yields determined by Denver Wool Laboratory.

SALE OF SCOURED SORTS 1948

Lot No.	Description of Wool	Net clean weight	Appraisal value per pound	Total Value
1	Fine Staple	4,091	$1.4355	$ 5,872.63
2	Fine French	1,696	1.3860	2,350.66
3	1/2 Blood	2,661	1.3365	3,556.43
4	3/8 Blood	2,408	1.2573	3,027.58
5	1/4 Blood	1,781	1.1484	2,045.30
	OFFSORTS			
6	Burry, Fine and 1/2 Blood	513	1.2870	660.23
7	Stain, Fine and 1/2 Blood	131	1.1385	149.14
8	Paint, Fine and 1/2 Blood	316	1.1583	366.02
9	Low, Fine and 1/2 Blood	100	1.2375	123.75
10	Burry, 3/8 and 1/4 Blood	260	1.0098	262.55
11	Stain, 3/8 and 1/4 Blood	121	1.0197	123.38
12	Paint, 3/8 and 1/4 Blood	110	1.0098	111.08
13	Low, 3/8 and 1/4 Blood	88	1.1286	99.32
14	Low, 1/4 Blood	163	1.0494	171.05
15	Crutchings, Rambouillet	238	1.1583	275.68
16	Crutchings, Crossbred	430	0.9999	429.96
17	Grading, Locks	191	1.0098	192.87
18	Black	160	0.8712	139.39
	TOTAL			$19,957.02
	Deductions*:	Handling charges		646.84
		Scouring or carbonizing		2,883.85
		Freight		633.16
		Trucking		18.20
		Service and Appraisal (CCC)		606.41
		TOTAL		$4,788.46

* These charges include the Beltsville clip (626 lbs.).

SUMMARY OF 1948 COLUMBIA FLEECE WEIGHTS BY GRADE

	"S"		"1/2"		"3/8"		"1/4"		"L 1/4"		TOTAL	
Breed	No.	Total	No.	Total	No.	Total	No.	Total	No.	Total	No.	Total
MATURE EWES												
K			9	83.0	179	1930.6	168	1952.7	21	259.3	377	4225.6
K2			4	37.4	65	698.4	87	1053.5	10	129.1	166	1918.4
K1B	1	12.0	4	40.1	6	62.8	2	20.6			13	135.5
K1L			1	8.3	10	110.2	8	91.9	1	13.3	20	223.7
TOTAL	1	12.0	18	168.8	260	2802.0	265	3118.7	32	401.7	576	6503.2
Ave.		12.0		9.38		10.78		11.77		12.55		11.29
YEARLING EWES												
K			9	86.5	102	1101.5	35	418.4	1	12.3	147	1618.7
K2			3	26.9	6	64.9	4	48.3			13	140.1
K1L					2	23.6					2	23.6
LXR					2	22.6	3	33.2			5	55.8
TOTAL			12	113.4	112	1212.6	42	499.9	1	12.3	167	1838.2
Ave.				9.45		10.83		11.90		12.3		11.01
MATURE RAMS												
K					25	378.0	23	366.4	2	38.2	50	782.6
Ave.						15.12		15.93		19.1		15.65
YEARLING RAMS												
K			6	61.9	76	893.7	25	328.6			107	1284.2
K2					2	26.9					2	26.9
TOTAL			6	61.9	78	920.6	25	328.6			109	1311.1
Ave.				10.32		11.80		13.14				12.03
MATURE CORRIEDALE EWES												
A			18	154.2	43	409.5	8	81.5			69	645.5
Ave.				8.56		9.52		10.18				9.36

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SUMMARY OF 1948 TARGHEE FLEECE WEIGHTS BY GRADES

	"F"		"S"		"1/2"		"3/8"		"1/4"		TOTAL	
Breed	No.	Total	No.	Total	No.	Total	No.	Total	No.	Total	No.	Total
					MATURE EWES							
T	20	181.5	62	611.4	211	2163.6	36	410.2	1	13.1	330	3379.8
T1	9	86.5	64	662.3	166	1852.0	32	381.1	2	25.3	273	3007.2
TOTAL	29	268.0	126	1273.7	377	4015.6	68	791.3	3	38.4	603	6387.0
Ave.		9.24		10.11		10.65		11.64		12.80		10.59
					YEARLING EWES							
	(L 1/4)											
T			7	73.4	93	929.7	7	79.2	3	34.3	110	1116.6
T1	4	49.3	28	278.4	69	755.4	16	185.8	11	131.5	118	1400.4
TOTAL	4	49.3	35	351.8	162	1685.1	23	265.0	14	165.8	238	2517.0
Ave.		12.32		10.05		10.40		11.52		11.84		10.58
					MATURE RAMS							
T			2	28.4	23	324.8	4	67.1			29	420.3
T1			2	24.4	13	185.8	3	50.8			18	261.0
TOTAL			4	52.8	36	510.6	7	117.9			47	681.3
Ave.				13.2		14.18		16.84				14.5
					YEARLING RAMS							
	"F"											
T	2	16.7	13	144.8	31	356.0	5	65.6			51	583.1
T1			8	91.7	16	190.4	3	42.5	4	54.0	31	378.6
TOTAL	2	16.7	21	236.5	47	546.4	8	108.1	4	54.0	82	961.7
Ave.		8.35		11.26		11.63		13.51		13.5		11.73